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Combat Crew

strategic air command

APRIL 1987

★★★★

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ACCEPTING THE CHALLENGE

When you look at your command, what do you see? To many people we are "The" strategic nuclear command. But this is only partially true. What actually exists is a Strategic Air Command with two very critical and equally important missions — nuclear and conventional. SAC has a proud heritage of maintaining the peace through strength in every arena. Peace is our profession — peace wrought by the dedicated will to fight and win wherever, whenever, and however we're called upon. We have and will continue to enhance our ability to fight and win at the conventional level — to give our leaders a chance to reason, to arbitrate, and to show an adversary we're prepared for any challenge they may pose. We are a command dedicated to keeping the peace through deterrence of aggression at any level, and should that be insufficient, giving our civilian leadership the credible, flexible conventional capability necessary to demonstrate resolve. Forty-plus years of freedom from nuclear war validate our nuclear deterrent. But building a credible conventional deterrent is another matter. This is our challenge — to develop and maintain a strong conventional capability. We are tasked with building a strategic air arm capable of working with our forces and allies in any scenario. We're committed to meeting that challenge. **You** are a vital part of the team as we step out smartly to add to our capabilities across the board.

Look around you. Today, you will find every bomber crew in SAC talking and training conventionally. Last year less than fifty percent did. Our equipment is improving, too. We're well along in procuring new weapons that will give our bomber force many new employment options against a wider range of targets in the near future. Meantime, we've developed new tactics to enhance our survivability in the present. We are optimizing our force to meet any challenge.

Hand in hand with our capability we are developing new training concepts like the Strategic Warfare Center to test the tactics, weapons, and capabilities of our crews in realistic threat conditions. We've instituted a new tactics course and are increasing our participation in TAC's Red Flag program. Entire units will now participate in Red Flag deployments as well as intensive short notice training deployments outside the continental United States.

As a tool to help gauge our progress, we've widened our ORI's to include conventional evaluations. Conventional ORIs provide a realistic test of a unit's ability to deploy its warfighting assets to a theater of conflict. We are not only training but testing across the spectrum to improve our capability. The scenarios are realistic and challenging.

Your wings are flying more off-station training. You are deploying to simulate your wartime taskings. A KC-10 squadron recently deployed a TAC unit to a bare base location and transported an Army brigade for the first time. Along with these many "firsts" we're revisiting valuable practices from the past. All of these tests and experiences are designed to build our capability and credibility as a flexible, responsive command.

How well you accomplish your conventional training on a daily basis will determine how well our command meets the challenges of the future. Strive to be the best aircrew in your squadron, the best squadron in your numbered Air Force, and the best in SAC. Challenge is our command's lifeblood. Improve your conventional skills. Be proud. The SAC shield symbolizes our success at peace through deterrence. But just as importantly, the shield represents the tools a warrior uses to fight and win. Our nation relies on this strong shield to continue maintaining the peace across the spectrum of conflict. Building on our conventional heritage, strengthening our conventional skills, providing you the warriors, with the weapons and leadership needed to forge and hone a conventional razor's edge, we will achieve conventional excellence. Your continued dedication and support are the key to adding conventional credibility to our renowned reputation for strategic nuclear deterrence. Accept the exciting challenge!★★

Major General E. G. Shuler, Jr.
Deputy Chief of Staff, Operations
Strategic Air Command

Combat Crew

Magazine of the Strategic Air Command — 37th Year of Publication

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ON OUR COVER

A KC-10 tanker photographed from the boom section of a KC-135. The Extender is gaining even more versatility with its participation in JA/ATT missions. For all the details, see page 4.

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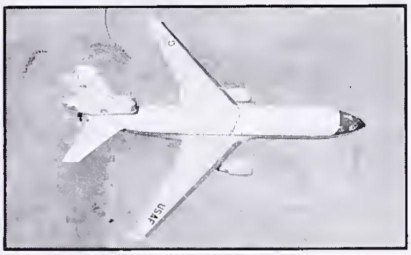

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NEXT MONTH

1987 OLYMPIC SHIELD Preview

KC-10 Joint Airborne/Air Transportability Training

Maj Bob Neidrick
Editor

The official name of the KC-10, "Extender," is very appropriate. It succinctly and accurately describes the KC-10's strategic advantage of being able to carry out its aerial refueling and cargo carrying missions without forward basing. The KC-10 thus "extends" the mobility of U.S. forces. This capability to project U.S. forces is an essential factor in supporting U.S. policy goals as the need arises.

One of the exercises KC-10 crews frequently participate in to prepare for their role as a force multiplier is Joint Airborne/Air Transportability Training (JA/ATT). JA/ATT provides air crews and members of sister services basic airborne training and proficiency/continuation training in a joint and realistic environment. The training is designed to ensure combat readiness of forces assigned to unified commanders. Airlift is an essential element of the program's concept and objectives.

Missions conducted under JA/ATT, but not necessarily involving the KC-10, include airdrop/assault/airland operations of personnel and cargo. Additionally, static loading exercises are authorized for the units of all services specifically tasked to perform or participate in air transportability missions. Other missions include airlift support for airdrop/air transportability certification of new or modified equipment or operational procedures and combat support missions (i.e., flare drops, leaflet drops, unconventional warfare activities). Missions specifically not authorized as part of the JA/ATT program include unilateral service training using airlift as a mode of transportation and point-to-point air transportation not involving airdrop, assault or airlanded operations.

The addition of the KC-10 to the Air Force inventory has provided another oversize cargo carrying aircraft for use during contingency operations. Limited USAF manpower precludes Air Force planning and loading of all aircraft during a contingency thus requiring trained personnel in user units. The Air Transportability Training (ATT) aspect of the JA/ATT program provides for this recurring training. MAC coordinates the KC-10 availability with SAC at a monthly JA/ATT conference; SAC provides the aircraft and aircrews, while

both commands provide instructors to conduct the ground loading course (load planning and actual loading). The KC-10 loading procedures are nearly identical to the Civil Reserve Air Fleet (CRAF) aircraft thus giving practice for users on both the KC-10 and CRAF aircraft. MAC coordinates KC-10 ATT activities with either a C-5 or a C-141 ATT. Concurrent training is required to assure the availability of a wide-body loader. The deploying C-141 or C-5 will carry the wide-body loader, as well as a 25K loader and/or 10K forklift, if required. Load planning and static loading training is provided on all aircraft involved. Scenarios have been planned with C-141, C-5 and KC-10 aircraft deploying units. The KC-10 is used in a combination role air refueling the C-141s, C-5s and other aircraft enroute plus transporting a full load of personnel and equipment.

Recently I had the opportunity to participate in a JA/ATT mission with a KC-10 crew from the 32 AREFS, Barksdale AFB. Unlike many of the joint exercises which are much larger in scope and longer in duration, ours lasted only one day and involved only one C-5A in addition to our KC-10. However, involvement with MAC and the U.S. Army was much different from a typical SAC mission and provided a glimpse of the KC-10's capabilities.

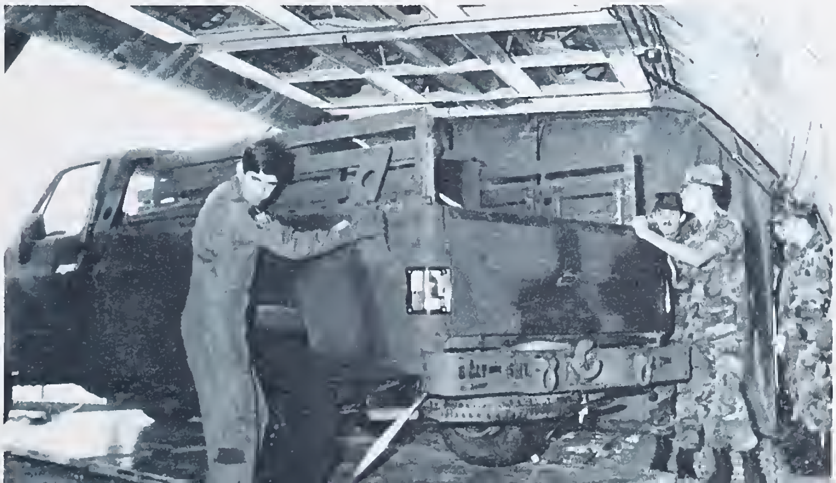
The KC-10 was flown by crew S-002 from the 32 AREFS: Maj Mike Leuschen, pilot; 1Lt Jeff Martin, copilot; MSgt Larry Sheeley, FE; TSgt Randy Collins, BO, and SSgt Charles Marrone, BO in the 32 AREFS training flight. Also serving as a staff instructor pilot and escort for myself and our photographer was Maj Dennis Craig, 8AF/DOTT. We departed Barksdale and flew a short hop to England AFB, LA, where we joined the C-5 and U.S. Army personnel. At that point, anything resembling a normal SAC mission certainly took on a new look. Sgts Collins and Marrone began uploading several vehicles of the 5/17 Squadron, 6th Cavalry Brigade from Ft. Hood, TX.

cont'd on page 26

Lt Martin receives a weather briefing with Majors Leuschen and Craig at Barksdale base operations.

Some may still refer to the KC-10 as the "Gucci" jet, but those who have seen it at work know why it is officially named the "Extender."

TSgt Randy Collins directs the loading of U.S. Army vehicles at England AFB.



MAYDAY! MAYDAY!

Capt Gary C. Byrd
911 AREFS, Seymour Johnson AFB

MAYDAY! MAYDAY! MAYDAY! Beaver Control, Casey 10. There's been a midair; we have two A-4s down!

Our day had started calmly enough with a decent wakeup time and a van ride from our motel into El Toro MCAS, California. Next on the agenda was a briefing with our Marine A-4 receiver pilots and preflighting our KC-10.

We were tasked with qualifying the Marines on the KC-10 drogue before another of our aircraft from Seymour Johnson arrived at El Toro to help us "drag" them across the Pacific to Iwakuni, Japan. It was one of those TDYs you usually dream about.

The briefing was thorough and our receivers were eager to get a fast ride across to Japan with a KC-10 versus a slow ride behind a Marine KC-130.

We took off first and established our orbit in AR 651 off San Diego under GCI control. Beaver Control monitored our first group of five A-4s as they came down track. We did a point-parallel on them and all went well. Three of the five departed from us out the top of the block when they were done, leaving one on the hose and one in the observation position on our right wing.

We heard our second flight of A-4s report in with GCI, and we advised them to stay well clear off our right wing until the remaining "chicks" from the first flight left. Our copilot checked their position visually out of his window and mentally noted how sharp their formation of aircraft looked. He counted four A-4s and minutes later another one joined the flight. The airfield was IMC and number four of their briefed five ship had to get a tumbling attitude indicator fixed before he could take off.

The copilot continued to monitor the rejoin by glancing over his shoulder every few seconds. We now had a complete formation on the wing. On their FM interplane frequency, the second flight was coordinating a position change to get aircraft four and five back into their briefed positions.

The next time the copilot looked over at the flight he saw a tanker pilot's nightmare; four and five hit each other with such force that the nose broke off one of the aircraft. One pitched full nose up and the other went nose down. As the two Marine aircraft slowed from the terrible G-loading, the copilot saw one jet engulfed in flames. It looked grim.

As the wreckage was dropping down and aft of us, we told our boom operator that we had witnessed a midair and to have the two A-4s he was controlling hold their positions. Our pilot punched "position hold" on our number three INS to mark the precise latitude and longitude of the mishap as the copilot keyed the GCI frequency.

"MAYDAY! MAYDAY! MAYDAY! BEAVER CONTROL, CASEY 10, THERE'S BEEN A MIDAIR, WE HAVE TWO A-4S DOWN! WE NEED YOU TO COORDINATE FOR SEARCH AND RESCUE."

We noted our position, airspeed, altitude, heading, winds at altitude and that we were picking up two distinct ELTs on UHF guard frequency and passed the information to Beaver Control, our GCI. Our pilot asked two A-4s from the second flight to descend and monitor the two mishap pilots and we checked out the right window to see them peeling off in a descending right turn, on their way. We put the coordinates of the accident position into a spare waypoint on the INS and went into orbit over the point advising our remaining receivers that we needed them to stay in loose formation as we remained overhead of the site.

Beaver Control made us "on scene commander" for the search and rescue and gave us the frequencies they were working. We made full use of the two VHF and two UHF radios on the KC-10. Luckily, we had no shortage of aircraft volunteering their services. The best choice available was a flight of two rescue helicopters already airborne, Calumet flight. We gave them a fast briefing including the air-to-air Yankee TACAN frequency to receive range and bearing from our aircraft orbiting overhead.

One of the downed A-4 pilots came up on his survival radio from his raft and reported seeing flares fired from near his location. With the rough seas and a 2000-foot overcast, a rescue could be tough. Because of the adverse conditions, we let only the Calumet flight descend through the cloud layer to search, leaving another chopper and a HC-130 "Hurricane Hunter" in reserve, but at a safe distance. They spotted the flare-firing pilot first and then the radio-equipped pilot vectored them to his position for pickup.

Within 18 minutes of ejection, both pilots were rescued, and we checked on their physical condition to help coordinate a recovery base with the necessary medical capabilities. They were both hypothermic and in shock with an assortment of cuts and bruises, but otherwise in good shape.

We had sent the various other aircraft home to ensure a safe work area and focused in on the needs at hand. Our rescue choppers with downed pilots aboard notified us that their low fuel state would not allow them to return to their base. During the rapid brainstorming session that followed on the search and rescue frequency, someone told us that the aircraft carrier U.S.S. Ranger was nearby and had a "clear deck." We contacted the carrier asking for permission for Calumet flight to land and refuel; it was quickly granted. We also ensured that the Ranger had medical personnel on deck and briefed them on the nature of the injuries.

GCI had both the flight of helicopters and the Ranger on radar, so we passed the Calumets a vector for the carrier as well as the Ranger's TACAN frequency. They bee-lined for the Ranger and received first class treatment from the Navy flight surgeons aboard. We remained on station as a radio relay until we were assured that the A-4 pilots no longer needed assistance and that the Calumet choppers were refueled and ready to fly to a shoreside medical facility if needed.

What had started out as a "routine" qualification flight in a beautiful Pacific sunrise could very well have had a sad ending, but thanks to briefings from our training flight folks back at home base during the last pilots' meeting, a little independent study on search and rescue procedures, and discussion among our crew about "what if we have a receiver go down over water," we had a plan. You can never cover everything that might pop up, but it sure helps to have a big head start before things go wrong in a hurry.

The next day we saw the two marine pilots after we came out of the briefing for that day's qualification mission. They were pretty well battered; cuts, bruises, eyes bloodied by windblast, but glad to be alive. They came over, shook our hands and sincerely thanked us for our help. They said it made them feel real good to know that we were up their aiding in their rescue—maybe almost as good as we felt to see those two safe and sound.

About the author. Capt Byrd is a KC-10A copilot on the 911 AREFS senior crew at Seymour Johnson AFB. His previous experience was in the KC-135A.

1Lt Mike Ladaw
384 AREFS, McConnell AFB

A Hundred and One Bold Tigers

This isn't the title of a new Walt Disney movie, it's what we call the 101 KC-135R sortie surge at McConnell AFB. From the 6th to the 8th of October 1986, the 384th Air Refueling Wing flew 101 consecutive on-time sorties in only 63 hours. Statistics are one thing, but what I'd like to do is let you see, from the average crew member point of view, what has come to be known as "Operation Bold Tiger," the flight portion of the 384 AREFW month-long exercise.

By 15 September, most of us had heard rumors of the "surge." During the next two weeks, our daily rumor mill generated new tales; and by the end of the month, anticipation and frustration levels were high. We were all ready to fly, but we really didn't know what to expect, except that we were in for some "real flying." I can assure you, however, that we were all ready.

Finally, on Saturday, October 4, I received the phone call from my AC. As I recall, the exact words were, "This is it, Oki. We go into crew rest tomorrow at noon. I don't know when our brief time is, but I'll call you when I get the word. We'll have at least an hour of heads-up time." Well, I thought, at least now I'll be able to enjoy the rest of my weekend to some degree. After all, midnight sure comes early when you have to get up and fly.

Sleep eluded me Sunday night. Since I was expecting a call around midnight, I was restless from the moment I hit the sack. After checking my clock every 15 minutes, I finally decided, "Hey, if they call, they call. If they don't, I've got to get some sleep." Luckily for me, I didn't get my call until 9:30 a.m. and was able to get a full night's sleep. My AC said the brief was at 10:30, so I got there at 10:00. The rest of my crew showed up within 10 minutes. Not surprisingly, they said they had also been up a major part of the night.

The rules of engagement stated that the premission brief was to be at least three hours prior to takeoff. This was usually ample time, since the weather, NOTAMs and all other miscellaneous base operations functions were completed on the spot. During our brief, we were informed of the overall mission, the mission timing and requirements. Since most sorties were flown in cell or MITO, those required briefings followed immediately. After the brief, the crew made last-minute adjustments and double-checked the paperwork. I really liked the way this was handled. No fooling around; plan, brief and fly—all in minimum time; the way it should be done.

Typically, we showed up at the airplane 50 minutes prior to takeoff. This was sufficient because of the tremendous job our maintenance people did. I was really amazed at how the maintenance folks had all the planes ginned up to 100 percent FMC. When an airplane did have a problem, it was "red-balled," and all specialists were readily available on the flight line. We usually continued our preflight around maintenance and always ended up with at least 10 minutes to spare prior to engine start. Those "knuckle-busters" really proved their worth during the whole exercise. There were no late takeoffs, due to their outstanding support. My hat's off to all those in maintenance.

Each crew usually flew two sorties a day for the first two days, and a single sortie on the third day. This averaged out to five sorties per crew during the exercise. Between landing and takeoff, for the record, we usually had about four hours. This gave us time to debrief, grab a bite to eat and rebrief for the next mission. After our second mission of the day, we often had a quick cold one during debrief. Unfortunately, because we were tired, that quick cold one was

Proud maintainers of the 384th AREFW gather around a graphic representation of their singular feat: 101 consecutive on-time sorties in only 63 hours.

almost always a Coke. By the time we got home, we had completed a 16-hour day. After crew rest, we were promptly back in the squadron for our next brief. "Eat, sleep and fly" was the rule of the day.

One sight I don't think I'll ever forget occurred during my third Bold Tiger sortie. We were number three in a three-ship MITO. What was unusual was that a six-ship cell had been taxiing out for takeoff 10 minutes prior to our takeoff. Well, as you can imagine, we ended up with nine KC-135Rs holding for takeoff. If you have never seen eight (from my view) "R" models all on the parallel taxiway at the same time, you're missing one beautiful sight. What was truly amazing, other than the birds on alert and one "cann" bird, was there weren't any other airplanes on the ramp. That's what I call maximum utilization. **All** FMC truly meant FMC! **All** the birds were flying.

On our last sortie for Bold Tiger, my crew was lucky enough to pull sortie 100 in cell with sortie 101. I remember during our preflight that there were smiles on the faces of all the maintenance folks. At first I thought they were all just slap happy and tired; but then I realized there was a celebration starting once we took off. I don't think I have ever seen such cooperation getting two late-night sorties off. As we taxied out, there were about 15 maintenance trucks lining the ramp—a nice send-off for the last two sorties of Bold Tiger. Just as we rotated, I'm sure there were a lot of cheers. It really felt good to know we had the team to do the job.

Although SAC tanker experts and historians are pouring over the record books, I'm sure that the 384 AREFW broke many records. For example, we were originally tasked with 85 sorties, but as part of the exercise we were loaded with an additional 16 sorties. Our Tigers flew a total of 269.4 hours, refueling 179 receivers and offloading 817,800 pounds of JP-4. With only 12 FMC aircraft on the first two days, and 13 on the last day, the wing was able to produce a utilization rate of 2.73. In simulating a real contingency, the maintenance folks sustained the surge capability until termination, demonstrating the capabilities of the aircraft as well as that of the ground crews.

Not since Giant Thrust in 1978 was the KC-135 sortie rate so challenged. This year, with the 384 AREFW's KC-135Rs, SAC has proven once again that the tanker is a highly capable and versatile aircraft. It's been shown that when called upon, the Stratotanker can do the job and do it well. The "R" model far surpassed the old "A" model in both capability and maintainability. We've proven that the "R" model is trouble-free and highly qualified for any job required for strategic or tactical refueling.

Bold Tiger will go down in the annals of SAC, if not the Air Force. The 384 AREFW has proven that the "R" model can sustain its flying capabilities even in the most rigorous contingency. We have shown that the role of the Stratotanker can be expanded. Because of exercise Bold Tiger, you can be confident that the "R" model will be at the ARCP, on time, with all the gas you need, well into the next century.

RC-135Rs of the 384th Air Refueling Wing flew a total of 269.4 hours during **"Operation Bold Tiger,"** refueling 179 receivers and offloading 817,800 pounds of JP-4.

About the author. A 1982 graduate of the University of Missouri, Capt Ladaw was assigned to the 384th AREFW at McConnell AFB following completion of combat crew training at Laughlin AFB. He has more than 1000 flying hours in the T-37, T-38 and KC-135R weapon systems.

SSgt Chuck Phillips
CFIC, Castle AFB

Air Refueling Overrun

"Pilot, Radar, the tanker is halfway through the turn, four miles forward range, looks like an overrun."

"Pilot copies, gunner, let me know when you have the tanker."

"Roger, pilot, gunner has the tanker at nine o'clock high, two miles."

Does this sound familiar? It probably does to many of you. These are typical interphone transmissions that are heard between bomber crew members during an air refueling overrun. While an air refueling overrun is not an everyday occurrence, when it does happen crew members must be exceptionally alert to avoid the possibility of a mid-air collision.

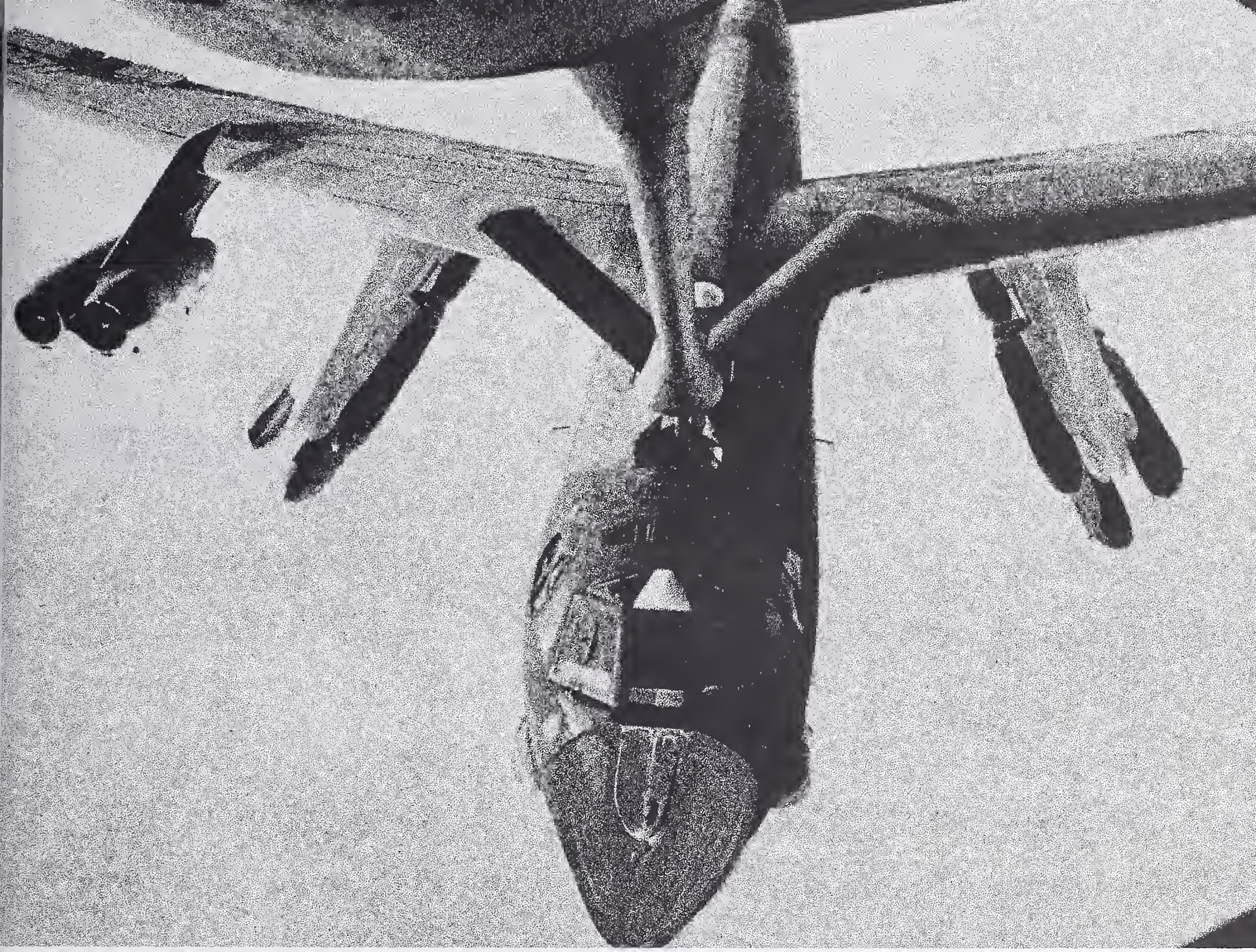
Let's take a look at the two most common situations that contribute to an overrun. The first is airspeed. If the bomber crew is on the airspeed schedule, they are maintaining 280 KIAS and have a closure speed in excess of 500 KIAS with the tanker. A bomber that's late tends to increase its speed to "warp factor nine" which increases the closure rate and begins the chain of events which can lead to an overrun. The next consideration is turn range and offset. Should either aircraft be "off the black line" or off airspeed, and these changes are not compensated for in the computation of turn range and offset, then our recipe is complete for an overrun.

What are the bomber crew member's responsibilities? First, the pilots are limited to visually scanning for the tanker, when weather permits. Visual coverage is limited from eight o'clock to four o'clock. However, in the weather visual scanning is virtually useless. How about the navigator team? The radar navigator can use the OAS (Offensive Avionics System) to electronically scan eight o'clock to four o'clock position, with no restrictions because of weather. In addition, the electronic warfare officer can pick up the tanker's radar signal by using his various receivers. Last but not least is the defensive aerial gunner. The gunner is in the best position on the aircraft to monitor the tanker after it has rolled out behind. The gunner accomplishes this by using the ASG-15 Fire Control System employed on the B-52G, and the ASG-21 Fire Control System on the B-52H.

The ASG-15 capabilities consist of an aft area coverage from three o'clock to nine o'clock, elevation information, and a range of zero to ten miles. This information is presented to the gunner on a radar indicator. The information is received in one of two ways, either by the search radar or, as a back up, emergency search using the track radar. The ASG-21 scans the aft area from four o'clock to eight o'clock, and has range capabilities from zero to six miles, with no elevation information. Again, this information is received from search radars, and presented on a radar indicator. The important point here is to interpret what the tanker is doing, and make accurate position calls to the rest of the crew. Once the actual position is known, it enhances the pilot's decision making process while rejoining with the tanker. As with the OAS, weather is not a factor with the Fire Control Systems.

So far you've seen the bomber capabilities during an overrun, now let's look at the tanker. The pilots are also limited to visually sighting. Here again, the weather conditions can limit visual sighting of the receiver. The navigator can use the radar equipment to skin paint the receiver with little difficulty out to about 15 NM. As you can see, there are many crew positions on each aircraft that can work together to help rejoin the two aircraft. If everyone is in sync, an overrun can turn out to be a relatively uneventful rendezvous.

For everyone to be in sync, however, the right hand must know what the left hand is doing. The only way to accomplish this is to start the coordination the day before, during mission planning. Crews must sit down and plan not only normal procedures, but also discuss



the unexpected including overrun procedures. Crew coordination is an essential part of rejoining after an overrun. Every crew position must be involved in this. You certainly don't need someone cluttering up the interphone or radios with unnecessary transmissions. Good crew coordination just doesn't happen overnight; it takes many hours of planning and practice as a crew. Coordinating overrun procedures must be discussed in detail every mission planning day. During the planning phase, it is important for each crew member to be aware of what the other crew positions will be doing, when they will do it, and what procedures will be used.

Areas open for discussion might include the following: at what point will the pilot stop calling tanker position? When will the radar navigator hand the overrun over to the gunner? Also, what interphone calls will the gunner make, and at what point will he hand it back to the pilots, and/or the radar navigator? If possible, get in touch with the other crew, and discuss your procedures with them. This way both crews know what to expect if an overrun occurs. An integral part of most of our missions is the air refueling phase; a successful rendezvous is an important prelude to that. Know what to expect in case of an overrun.

Now, I want to leave you with a little food for thought. We usually enjoy VFR weather conditions while conducting air refueling operations, and many times take for granted the ability to visually acquire the other aircraft. We must practice each and every overrun like it would be if we were IFR. Then when the weather isn't cooperating, we can insure a safe rendezvous, and a safe mission. **Fly smart. Fly safe!**

About the author. After graduating from the 4018 CCTS in 1980, SSgt Charles J. Phillips was assigned to Carswell AFB until 1983. Now possessing over 2000 flying hours, Sgt Phillips serves as a senior CFIC instructor defensive aerial gunner at Castle AFB.

Maj Gregg Fonner
SIFC, Castle AFB

ARSA Savvy

Mention Airport Radar Service Area (ARSA) in any pilot meeting (especially if civilian pilots are present) and watch the feathers fly! After the dust has settled, usually very little productive exchange of ideas will have taken place. Regardless of one's opinion (pro or con) about this newest piece of controlled airspace, its benefits or lack thereof, or its implementation around the country, the fact is that there are at least 69 of them in effect. There are ARSA's around ten air force bases including Beale, Castle, March, Mather, McClellan, and Norton in California; Davis Monthan in Arizona; Offutt in Nebraska; Tinker in Oklahoma; and Fairchild in Washington. There are an additional 20 ARSA's at locations near air force installations. Seventeen new ARSA's will spring up before the year is out (get ready, Barksdale — yours is slated for May 87) and FAA has plans for a total of 115 or so by 1990.

The one big difference between the Terminal Radar Service Areas (TRSA's) they were designed to replace and ARSA's is the fact that participation by the VFR community changed from voluntary to mandatory under ARSA rules. The major perceived benefit for pilots in the IFR community is the elimination of those dreaded "uncertain" traffic advisories. . .12 o'clock, three miles, altitude unknown! The logic runs that if the VFR target on the controller's scope has to talk to him (mandatory participation), the controller can find out his altitude, heading, etc., deconflict the situation and keep everyone safe. That's the way it will normally work, but a common misconception is that everyone will be treated equally with IFR separation for all. That's just not true!

The following services will be provided by controllers IAW FAAH 7110.65:

(1) "All aircraft will be sequenced to the primary airport." That's convenient, no problem so far.

(2) "Standard IFR services to IFR aircraft." That's nice, no real changes to our normal operations. We fly, squawk, and talk just like we do anywhere else under IFR rules. This means that the ARSA boundaries and altitudes really have very little operational impact on IFR pilots. Nothing really changes whether we're inside or outside the ARSA, because our IFR flight rules remain the same.

(3) "Separation, traffic advisories, and safety advisories between IFR and VFR aircraft." Here's where the fun starts, because separation standards vary as the method of separation changes. One method is visual separation. With this method, the controller gives you a traffic advisory, you report the traffic in sight, and then the controller can give you the authority to continue your flight while "maintaining visual separation" from the reported VFR traffic. That means it's up to YOU to maneuver your aircraft to avoid the VFR target. VFR separation standards apply here. For vertical separation, stay at least 500 feet above or below the VFR aircraft until you pass clear of it before continuing a climb or descent. If you're co-altitude, then apply the VFR right of way rules in the Federal Aviation Regulations (FAR's) and choose whatever lateral distance is comfortable to you. FAR 91.65 says "no person may operate an aircraft so close to another aircraft as to create a collision hazard." Since no specific distance is mentioned, use your best judgment. FAR 91.67 covers the right of way rules. For aircraft converging on an angle, the aircraft to the other's right has the right of way. Head on, each aircraft will alter course to the right. And if you're overtaking another aircraft, that aircraft has the right of way. You will alter course to the right and remain well clear. Notice that the controller is off the hook once he says "maintain visual separation" and you say "roger." It's not fair to fly close to someone else visually and then file a HATR! Yes, it's happened!

When the controller is providing your separation, he'll do so with either vertical or lateral separation. Inside ARSA airspace, he can assign VFR aircraft altitudes in order to keep them 500 feet above or below IFR aircraft. Once the VFR aircraft is clear of you, you might hear the controller clear him to "resume appropriate VFR altitudes." Above 3000 feet AGL, that means the VFR pilot will go back to an even (westbound) or odd (eastbound) thousand plus 500 feet and continue cruise flight. Below 3000 feet AGL, the VFR pilot is free to choose any altitude he wants as long as he complies with the general minimum safe altitudes in FAR 91.79. For light aircraft who will be vectored beneath heavy aircraft, the controller will attempt to increase the separation to 1000 feet below for wake turbulence. If the controller is forced to make do with 500 feet, then he'll fall back to increased lateral separation to protect the light aircraft from wake turbulence. That equates to five miles for cruise flight and six miles on final. If wake turbulence isn't a factor, then lateral separation gets interesting. Since we're talking IFR versus VFR, the controller doesn't need to apply the familiar minimum three mile IFR vs IFR standard. Instead, since the pilots should be looking out the window and clearing, and since traffic advisories are being supplied, the controller's mandate is to use the radar for "conflict resolution." The pilot/controller glossary tells us that the controller will not let the radar target blips on his scope touch. My radar controller experts tell me there's no real way to quantify what this means as far as separation is concerned. It depends on the quality of a given radar's resolution and distance from the antenna. One thousand feet or less lateral separation would not be unrealistic. Many IFR pilots have been startled to see a VFR target vectored so near them. It's perfectly safe and legal, just different from what you're used to. Using this mix of VISUAL — (you see him, so don't hit him) and RADAR — (don't let the blips touch) scenarios during VFR conditions allows for much more flexibility on the part of both pilots and controllers than would a purely IFR separation standard.

Remember also that the mandatory ARSA airspace is not really all that large. ARSA airspace consists of two circles centered on the primary airport. The inner circle has a 3 NM radius and extends from the surface to 4000 ft AGL. The outer circle goes out to 10 NM and extends from 1200 ft AGL to 4000 ft AGL. A normal IFR traffic pattern will have your aircraft exceeding 10 DME on most occasions. Once you do that you're back to the old standards of see and be seen. Even though ARSA's have an "outer area" good to 20 NM and up to the ceiling of your approach control's airspace, VFR participation in the outer area is only voluntary.

Remember, no matter how noble the intentions of all concerned, these defined pieces of controlled airspace still suffer from the attempts of imperfect humans to fly inside them. Recent history over Los Angeles and Salt Lake City serve as testimony to the results of not following the rules. Be prepared, understand your airspace and its limitations before you fly, and keep your eyes scanning outside of the cockpit while you're airborne. Until next month, **fly safe** — and if you have questions, fire them our way at autovon 347-4571.

About the author. Maj Fonner is a 3700 hour KC-135 IP assigned to SIFC. In addition to his two years at SIFC, he's been a CCTS flightline IP at Castle AFB, KC-135 IP at Beale AFB and a T-38 IP at Reese AFB.

Prevention of B-52 Induced Hearing

Capt Keith B. Bartsch
Capt Mark W. Bryant
340 BMS, Blytheville

Imagine you've just landed after a normal B-52 training mission. The bombs and missiles were shacks and the ECM activity was reliable. The copilot even "greased it on" after a tricky ARDA directed by the radar navigator who just returned from SOS. There was a little confusion over a Center call during the climbout, but that was the only flaw in an otherwise great flight. The forms are closed and the crew bus pulls away from the aircraft. No one is the worse for wear — or are they?

Those eight J-57s that kept you airborne for eight hours produced a lot of noise. Onboard avionics and the air conditioning system also contributed to the din. This combination multiplied by 50 (the average number of flights per year) does more than just develop highly trained crews. It almost insures pronounced hearing impairment over the course of your flying career. There is, however, a simple solution to the problem. Regular wear of additional hearing protection provided by several available types of earplugs can substantially reduce the risk of hearing loss brought on by doing your job in the B-52.

You already know your job requires exposure to large, noisy engines in a closed environment for extended periods. You probably also know that some hearing loss is to be expected over the long haul. The key word in the preceding statement is "some." The realization that this problem exists and is preventable makes all the difference.

The human ear is a miraculous organ. Besides detecting even the faintest sounds, it analyzes them and communicates their characteristics to the brain. The external ear initially receives the sound vibrations which are passed to the middle ear. The middle ear, in turn, produces the vibration of the inner ear bones which causes a movement of fluid inside the inner ear canals. This stimulates the auditory nerve which transmits the impulse to the brain for interpretation. Ordinarily, this system works beautifully and can last a lifetime.

Unfortunately, a number of problems can develop which may severely affect a person's ability to hear. Wax buildups, perforated eardrums, ear infections and excessive noise exposure are among these. Let's take a closer look at the last of these, excessive noise exposure.

When noise is excessive or of long duration, deterioration of the auditory nerve results. A sudden explosive sound can tear hair cells from the vibrating membranes, resulting in severe and permanent hearing loss. Prolonged exposure to loud noise causes a gradual impairment of auditory nerve function. If the excessive noise continues, the hearing impairment will become worse.

Normal day-to-day life is full of potential hazards to hearing. Loud music from your stereo produces noise around 90dB. This is not dangerous for brief periods, but if practiced regularly can cause problems. A chain saw cranks out around 120dB, which will definitely affect hearing after relatively short exposure.

The critical noise level that begins damage to the auditory nerve is around 85dB for an eight hour exposure. Below 78dB continuous exposure, few ears are ever damaged. Above 100dB, as in the B-52 for example, impairment comes at an increasing rate for exposure as short as 30 minutes. At levels above 115dB, such as found near a small aircraft engine, no ear is safe and deterioration begins quite rapidly.

OSS

Everyone who works in or around aircraft knows that noise related deafness can be avoided by the use of proper hearing protection.

Armed with all this knowledge, let's now look at some research conducted onboard a Blytheville B-52G on a typical training mission. We employed the help of a local flight surgeon, Maj Richard Chengson, and a cooperative navigator, 1Lt Don Ryan, to acquire our data.

The navigator was equipped with audiometer dosimeters attached to his helmet exterior as well as the interior of one ear cup. The average result of the readings was 103dB outside the helmet and 96dB within the ear cup. Therefore, a conservative estimate of noise attenuation provided by the helmet alone is 7dB.

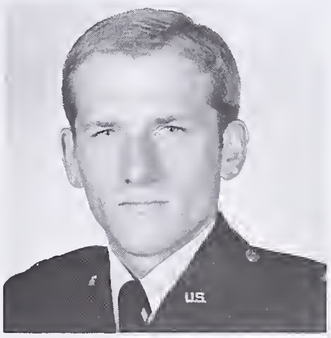
Stay with us now. Additionally, sound level readings were taken at the instructor pilot position by a dosimeter attached to the exterior of a helmet worn by Dr Chengson. These readings follow.

Pre-Takeoff (idle)	94dB
Takeoff	105dB
Low Level	96dB
Air Refueling	99dB

When you consider the helmet only provided 7dB protection in our test and noise of 84dB or greater is hazardous as defined in AFR 161-35 "Hazardous Noise Exposure," a simple fact surfaces. You don't have to be a rocket scientist to figure out the helmet alone won't adequately protect your hearing. Incidentally, our noise readings were very close to those provided us for comparison by the staff of the Physiological Training Unit at Little Rock AFB.

Enter the earplug. According to our local Environmental Health personnel, Dr Chengson, and an unscientific poll of our bomb squadron, most flyers wear the compressible foam type if they wear earplugs at all. These offer approximately 20dB protection and are quite comfortable. Add this 20dB protection to the 7dB provided by the helmet and you can see that even during takeoff, the noisiest phase of flight, you will receive well below the hazardous noise level of 84dB.

Granted, this test is probably not as "air tight" as one with unlimited time and resources might have allowed. We were not trying to win a Nobel Prize. We only want to make this important point. If you fly the B-52 long enough and don't wear additional hearing protection, noticeable hearing loss will result. The safe thing to do is to wear earplugs, turn up the interphone and radios a bit and enjoy good hearing long after your last flight in the B-52.



About the authors: Capt Bartsch is a B-52H electronic warfare officer assigned to the 340 BMS at Blytheville AFB. He is a graduate of The Citadel and has completed SOS.
Capt Bryant is a B-52G navigator assigned to the 340 BMS Training Flight at Blytheville AFB. He is a graduate of Middle Tennessee State University, has completed SOS and is pursuing a Master of Science in Operational Management from the University of Arkansas.

UNEASY RIDER

Sgt Jamie Robey
28 AD Ground Safety Division
Tinker AFB, Oklahoma

Imagine yourself streaking blindly the wrong way down a one-way street. I'm not talking about streaking as being naked in a crowd; I'm talking about being on a runaway motorcycle and not knowing what to do about it. Well, I know of an incident where this really happened. To preserve his real identity, let's call this guy "Dizzie," short for Disaster.

Being 19 years old and trying to support an old Chevy truck was becoming tougher and tougher with gasoline prices soaring well out of his reach. That's when the idea came to sell the truck and buy a motorcycle. Dizzie thought to himself: *Shoot, everybody else rides motorcycles and I've been riding bicycles ever since I was six years old; so a motorcycle will be no problem.*

The day came and Dizzie went to the local motorcycle dealership and picked out the bike he thought would best fit his needs. It was a 250cc street bike with two exhaust pipes. So what? you say. Dizzie thought the two pipes made it look like a "mean machine" and he couldn't wait to get out and terrorize the general public. Little did he know that's what would be happening later.

The deal was made; but since Dizzie had never been on a motorcycle before, he had the man from the dealership ride it home for him—Dizzie walked.

After a couple hours, sitting on this monster machine and trying to figure out all the levers, gismos and gadgets, Dizzie thought he was ready to conquer this beast. With his shiny new helmet and required safety equipment on, he blasted off. Away he went through yards, rose bushes, gardens, across sidewalks and over garbage cans totally out of control.

SAFETY CROSS FEED

On he went, finally getting the bucking bronco machine under control. Dizzie thought the worst was over and he could get on with his learning, especially how to shift.

Well, he got the shifting part figured out and was on his way over to a friend's house to show that he had mastered the art of motorcycle riding in 30 minutes. Now, this motorcycle must have had a mind of its own and decided that Dizzie was getting too cocky at the controls; so it decided to put the fear back into him. While stopped at a busy intersection, waiting for a break in traffic, the motorcycle planned its strategy. A small break in traffic was coming and Dizzie was primed for blasting across the street.

When he gunned the throttle and let loose of the clutch, the fun began. Instead of shooting straight across the street, this merciless machine took him down the middle of a one-way street, the wrong way. Dizzie had no idea what to do about the situation he was in.

The problem was suddenly solved for him when he was stopped by the front end of a pickup truck. Dizzie didn't remember seeing anything except the speedometer climbing past 30 mph. The effect of the impact was greatly reduced because the pickup truck had come to a complete stop and was backing up in an effort to get away. But that didn't work. Dizzie and his monster machine parted the pickup truck's radiator right down the middle.

Dizzie flew over the handle bars, slid up the hood of the truck, kissed the windshield and landed in the street behind the truck. As bad as all of this sounds, the old brain bucket (helmet) did its job and kept him from losing his head. Dizzie immediately stood up, not realizing fully what had happened until he saw the damage to the truck and the mangled motorcycle.

The fire department responded to hose down the fuel that was spilled, the wrecker came to haul away the mess and the ambulance came to take Dizzie to the hospital to check him out.

Before he could get away from the scene, the police arrived with a couple of presents for Dizzie. If crashing his brand new bike, messing up someone else's only means of transportation, creating work for the fire department and creating a massive traffic jam at quitting time wasn't enough, he was handed two traffic citations from the police. Dizzie had no motorcycle operator's license or any kind of formal training or instruction for operating a motorcycle.

* * * *

Dizzie learned his lesson. I know because I'm Dizzie. I've been through many open fields learning on a not-so-mean motorcycle, a 125cc; I've even had a couple of motorcycle rider's courses and received my motorcycle operator's license. But how many other Dizzies are there on the road? Don't learn the way I did. Play it smart. Obey traffic laws, learn to operate your vehicles safely and please consider that you may just save more than one life.

Courtesy *Eyes of the Eagle,*
May 86

SAC Perspective

During 1986, hands-on motorcycle training was completed by 4,179 motorcycle operators through the SAC training program. This program has been in effect since April 1985, and has resulted in a 60% reduction in fatal mishaps and a 23% reduction in all motorcycle mishaps. This program will continue to be improved and used throughout SAC. The training consists of a nationally recognized skill testing/evaluation program such as Motorcycle Riders Course (MRC), Better Biking Program (BBP), Motorcycle Operator Skill Test (MOST), or MOST II. The classroom training specified in the basic regulation and hands-on skill testing will be completed before issuance of permanent on base registration. This applies to military personnel and DOD civilian employees who operate a motorcycle on base. Hopefully there are no "Dizzies" in SAC, but there has to be a starting point for everyone who operates a motorcycle and we hope that starting point is with our "hands-on" training. Happy cycling.

PROFESSIONAL PERFORMERS

Flying Crew

On 11 September 1986, Lt Col Michael Musholt, 9 SRW, Beale AFB, took off on a routine functional check flight in a TR-1. A pressure suit was worn as several aircraft systems checks were to be performed above FL600. Preflight, taxi, takeoff, and climbout were normal. A level off at FL230 was accomplished to perform an aircraft rigging check. The required procedure is to accelerate the aircraft in level flight and note whether the yoke position remains near neutral. After performing the check, the throttle was retarded, but the aircraft kept accelerating. Lt Col Musholt's first reaction was to keep the aircraft from exceeding maximum allowable airspeed. He declared an emergency and initiated a climbing turn back toward the departure base. The throttle was further retarded but the engine remained stuck at 92 percent rpm. He suspected a disconnected throttle but couldn't be sure he didn't have some other kind of malfunction. He discussed his options with squadron operations personnel and it was determined the engine would eventually have to be shut down. By now the aircraft had climbed to FL480 and was decelerating. The gear and speed brakes were extended. The aircraft continued a descent to a minimum of FL290 where the increased engine thrust equalled drag to maintain maximum allowable airspeed. The aircraft was configured for a flameout landing and the cockpit was preheated to 85° F. The increased temperature prevented frost from forming on the cockpit windows but made it very uncomfortable for the pilot in a pressure suit. The engine was shut down using the fuel cutoff switch. Lt Col Musholt spiraled down over the departure base trying different combinations of airspeed and bank angle to get a feel for the descent rate. The landing was uneventful with touchdown about 1000 feet down the runway. Col Musholt's superior airmanship and systems knowledge resulted in the safe recovery of an extremely sensitive and valuable Air Force aircraft.

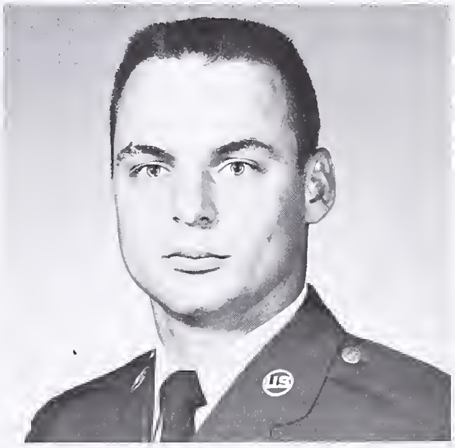
Missile Crew

The 308 SMW Crew S-234, 1Lt John R. Savageau, MCCC, 1Lt Lewis P. Waldron, Jr., DMCCC, TSgt Mark W. Beck, MSAT, and SSgt Kenneth S. King, MFT, is SAC's Missile Crew of the Month.

Crew S-234 was proceeding toward complex 373-3 on Arkansas Highway 5. They were flagged down by three youths standing in the rain over a man who was unconscious, lying in the road. They stopped their crew vehicle to investigate. The man had just been struck by a car. He had a large open wound on his head and his body was in an unnatural position. Sergeants King and Beck immediately went back to the crew van for emergency supplies. Lt Waldron called the base on the vehicle radio and maintained an open emergency line with the 308th Traffic Control Center. Lt Savageau placed his scarf over the open wound and secured the man's head and neck, while Sergeants Beck and King retrieved linen from the crew van which they placed under and around the individual's head for protection. They also treated him for shock and sheltered him from the rain. Lt Waldron maintained contact with the base and coordinated the dispatch of an ambulance and the police, while Sergeants Beck and King directed traffic away from the scene. Several 308th Security Police members arrived on the scene and took over traffic control. The crew obtained more blankets from the security police to help keep the man warm and prevent shock. When the ambulance arrived, the crew assisted the paramedics until the man was stabilized enough to transfer to the hospital. Their superior performance in dealing with this emergency helped save a life, and exemplifies the highest standards of the Strategic Air Command.

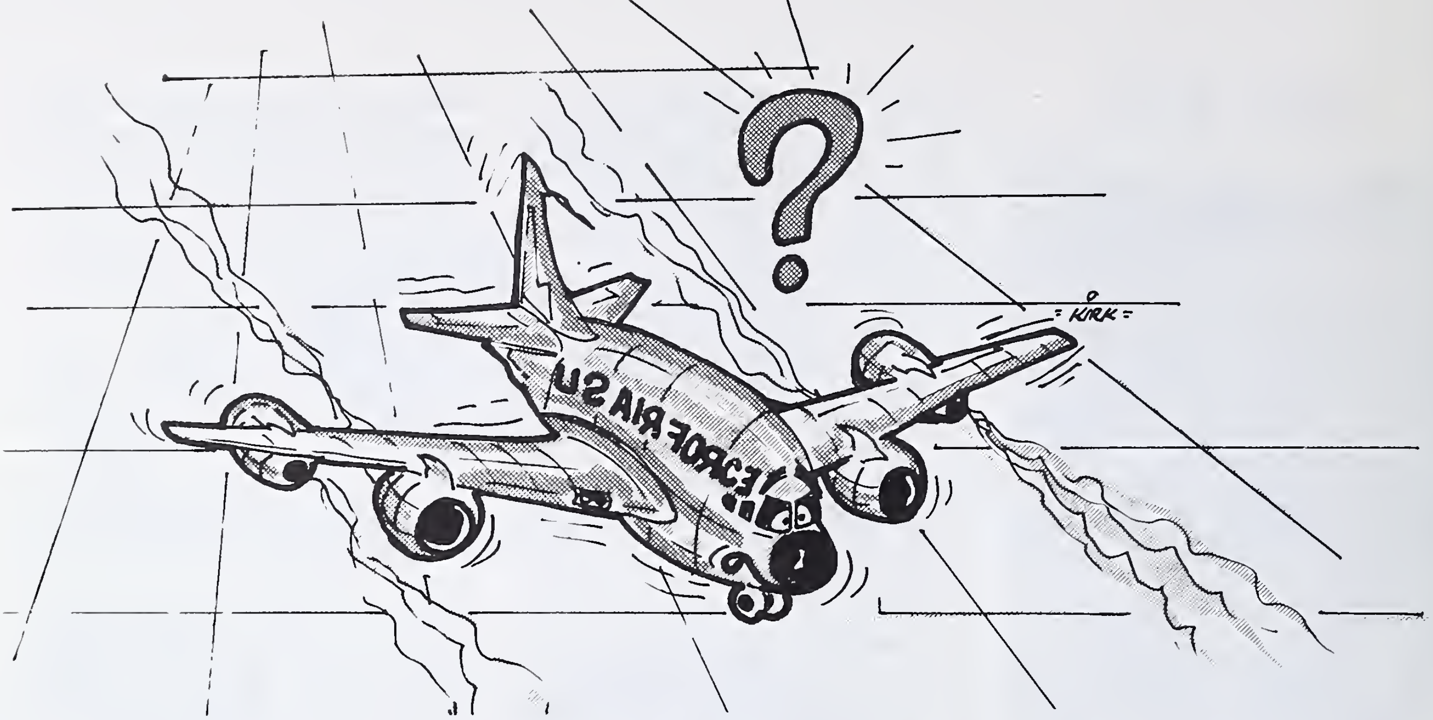
Missile Maintenance

Sgt Jimmy L. Freeman, 308th SMW, Litle Rock AFB, is SAC's ICBM Maintenance Airman of the Month. Sgt Freeman is assigned as a missile fuel life support specialist. His work includes insuring critical life support equipment performs at its peak to provide the best possible protection. He has received numerous "Highly Qualified" ratings for his flawless maintenance. He helped develop technical data for the use of the oxygen booster pump units and his team implemented an oxygen booster system for the Bio-pak 45. Sgt Freeman prevented deactivation operations from stalling by working around the clock, manually inspecting all overdue environmental control units (ECUs) when the ECU automatic testers were down for modification. Sgt Freeman built work storage shelves during off-duty time which reduced wasted space in his shop. He also implemented a mechanical eraser system for RFHCOs.



Munitions Maintenance

SSgt Michelle E. Shicora, 96 BMW, Dyess AFB, is SAC's Munitions Airman of the Month. As the assistant NCOIC of the Support Section, Sgt Shicora played an important role in the transition of the Air Weapons Branch from weapons support of the B-52H to the B-1B. She was responsible for ordering, receiving, posting, maintaining and reviewing over 480 T.O.'s, 120 regulations, and more than 4000 microfiche items for a branch of over 80 people. She tracked and posted hundreds of T.O. changes for over 90 T.O.'s being almost completely rewritten in her branch. Many of these changes affect the safe, reliable use of the equipment and must be very closely monitored and immediately posted to ensure the branch stayed on track toward initial operational capability. During the HQ SAC Management Effectiveness Inspection, the Support Section was commended for the outstanding condition of the T.O. library. Sgt Shicora is the reason this area was rated so highly.



"Close Enough for Government Work"

Lt Randy D. McDonald
91 SMW, Minot AFB

An effective mishap prevention program not only ensures a safe and healthful working environment, but preserves our precious defense resources.

Because of their position, knowledge and closeness to the grass roots workers, supervisors are perhaps the most important individuals in the chain of command. It is the supervisor who holds the key to an effective safety program. The attitude of the supervisor towards safe operations is, in many cases, likely to be the attitude the workers adopt. Supervisors, what is your attitude?

We've all heard the tongue-in-cheek adage, "That's close enough for government work." Do you use it? Is it used by your people? Do they pawn off substandard work just because it's government work?

We wouldn't tolerate substandard work by the local repair shop working on our private vehicles, and we wouldn't tolerate it by any business repairing or remodeling our homes. Therefore, if we can't tolerate it in our private lives, we can't tolerate substandard work just because we work for the government.

"That's close enough for government work" implies that civilian employers require more exacting standards from their employees. We, in the United States Armed Forces, are tasked to maintain and guard the freedoms we enjoy through our superior technical advantages. With today's highly sophisticated equipment, substandard work is completely unacceptable.

Complacency, apathy, inattention and lackadaisical attitudes are sure signs that a mishap is destined to occur. The key to preventing mishaps is to identify and eliminate hazards before they cause injuries or damage.

Supervisors, do you see any hint of apathy creeping into the quality of the work your people do? If so, now is the time to initiate change. Motivate your workers, educate them, be an example. Show them pride, teach them pride, insist upon pride. By taking pride in one's work, the task will be done correctly the first time, and seldom will any repeat work be necessary.

Pride in one's work and area of responsibility will not only insure a well-maintained weapon system and/or support equipment, but it will enhance our ability to maintain our freedom and world peace by keeping our limited defense resources serviceable and on alert.

Most mishaps are caused by a chain of events usually including one or more unsafe acts or conditions. By changing an undesirable attitude to one which reflects pride in accomplishment, unsafe acts can be greatly reduced.

About the author. Lt McDonald is a Minuteman III missile maintenance officer working in missile safety. He has 14 years prior enlisted time in aircraft radio repair and medical radiology.

Weapon System Safety Rules

Capt Thomas Billick
4315th CCTS, Vandenberg AFB

At one time or another, nearly every missile crew member has faced a situation requiring a decision affecting the safety and security of weapon system resources. Fortunately, guidance in the form of technical orders and regulations have been developed to help crew members choose correct courses of action. Examples of regulations providing specific rules for the safe operation of weapon systems are AFR 122-22 (Titan), 122-23 (Minuteman) and AFR 122-20 (Peacekeeper). These regulations are more commonly known as Weapon System Safety Rules or WSSRs.

WSSRs were established as a result of numerous studies conducted throughout the life cycle of the Minuteman and Peacekeeper weapon systems. They apply to all phases of weapon system operations and ensure the following Department of Defense Nuclear Weapon System Safety Standards are met:

(1) There will be positive measures to prevent nuclear weapons involved in accidents or incidents, or jettisoned weapons, from producing a nuclear yield.

(2) There will be positive measures to prevent deliberate prearming, arming, launching, firing, or releasing of nuclear weapons except upon execution of emergency war orders or when directed by competent authority.

(3) There will be positive measures to prevent inadvertent prearming, arming, launching, firing, or releasing of nuclear weapons in all normal and credible abnormal environments.

(4) There will be positive measures to ensure adequate security of nuclear weapons, pursuant to DOD Directive 5210.41.

These standards have been met continuously since the United States first acquired a nuclear weapon capability in 1945. Since that time, there has never been a mishap which resulted in a nuclear yield. Think about it. During all the handling, transport, testing, training and even in the few unfortunate incidents that have occurred, not one person has been endangered by an accidental nuclear detonation or by the radiation resulting from such an explosion.

The specific rules outlined in WSSRs cover a wide range of topics, all of which are important to the safe operation of the weapon system. Some of the areas addressed are launch facility security, operational code control, safing requirements, single flight operations, emergency combat capability operations, Improved Simulated Electronic Launch — Minuteman (SELM) tests, Airborne Launch Control System (ALCS) aircraft access to launch facilities, and restrictions on crew member rest periods. Some of the topics mentioned in WSSRs are cross-referenced to other Air Force publications in an effort to avoid unnecessary repetition. All referenced Air Force publications are required to conform with WSSRs and meet the Department of Defense Nuclear Weapon System Safety Standards. Obviously, no single regulation can provide guidance for every possible scenario. Realizing this, WSSRs have provided commanders with the option to deviate from specific rules in an emergency, with the exception that nuclear weapons will not be expended until an emergency war order authorizing launch is received and authenticated.

Hopefully, this article has given you a general introduction to Weapon System Safety Rules. It is imperative that all missile crew members completely understand the safety rules affecting their respective weapon system. Remember, in operations involving nuclear weapons, there is no room for incomplete knowledge or substandard performance. **Be safe. Be smart!**

About the author. Capt Billick is assigned to the 4315th Combat Crew Training Squadron where he has been an ICBM Operations Instructor and ICBM Courseware Developer. Prior to this assignment, he was an Instructor Missile Crew Commander at Malmstrom AFB.

The B-52...35 Years Young

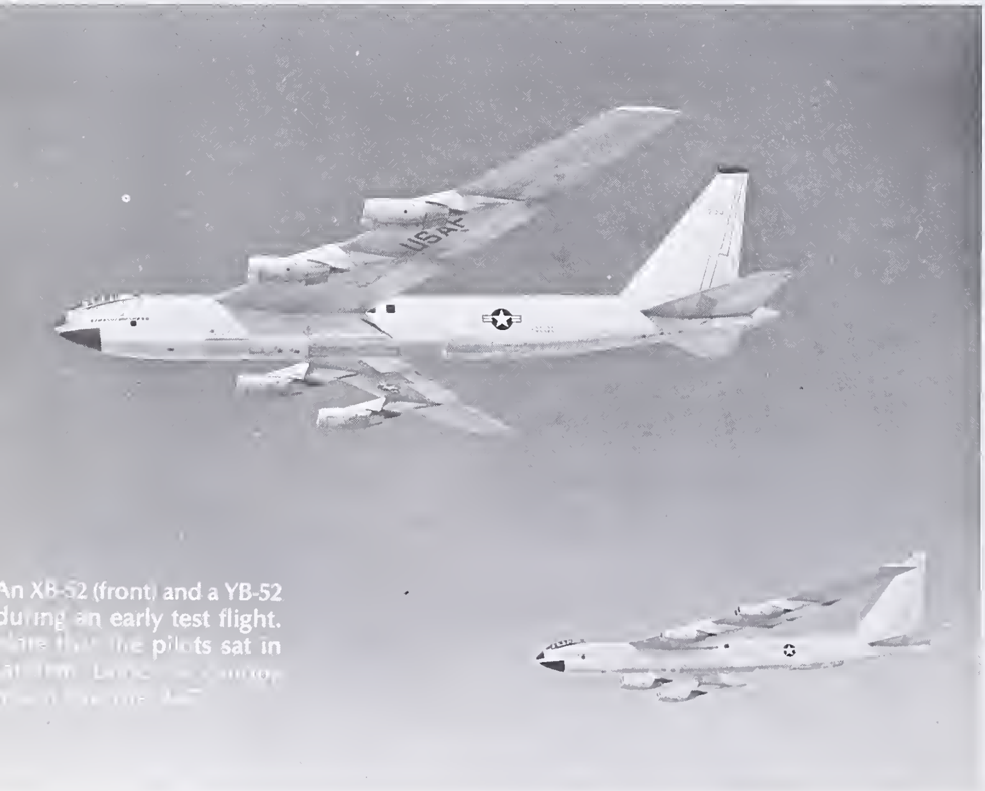
Mr A. T. Lloyd
Boeing Company

B-52 Developmental History

During WWII a requirement for a 10,000-mile mission bomber was conceived. In August 1941, British Prime Minister Sir Winston Churchill and President Franklin Delano Roosevelt decided what steps should be taken in order to provide a means of bombardment of the enemy in the event that African or English bases should be lost. From this historic meeting the impetus sprang for the U.S. Army Air Force's intercontinental bombardment requirement issued in 1946. The original requirement called for an airplane capable of speeds of 450 mph, having a 35,000 foot tactical operating altitude and a 40,000 foot service ceiling, possessing a 5000 statute mile tactical radius with a 10,000 pound bomb load, flying at an average speed of 300 mph, taking off over a 50 foot obstacle within 7500 feet, and clearing a 50 foot obstacle and landing within 4500 feet.

The first airplane to fit into the intercontinental bombardment category was the Consolidated B-36. On 8 August 1946, the six-engined YB-36 made its maiden flight and on 26 June 1948 the first B-36A came into the SAC inventory.

Boeing was awarded an engineering study and preliminary design contract for the B-52 in June 1946. Design efforts by Boeing continued throughout the latter half of the 1940s. Frequent changes of mind resulted in a variety of design concepts being considered in order to meet the fluctuating Air Force criteria. The major reason for these changes was the fact that the Air Force was striving to achieve its ultimate objective — that of developing the best airplane for the mission of delivering an atomic weapon from continental bases within the existing state-of-the-art limitations while taking a calculated risk in estimating future developments of the airplane and its related components. At one point, the U.S. Air Force considered abandoning the B-52 program in favor of the Northrop B-49 flying wing. It was also rumored that an improved B-36 would soon be in the offing, making abandonment of the B-52 project a distinct possibility.



An XB-52 (front) and a YB-52 during an early test flight. Note that the pilots sat in [illegible]

B-52 Design Studies

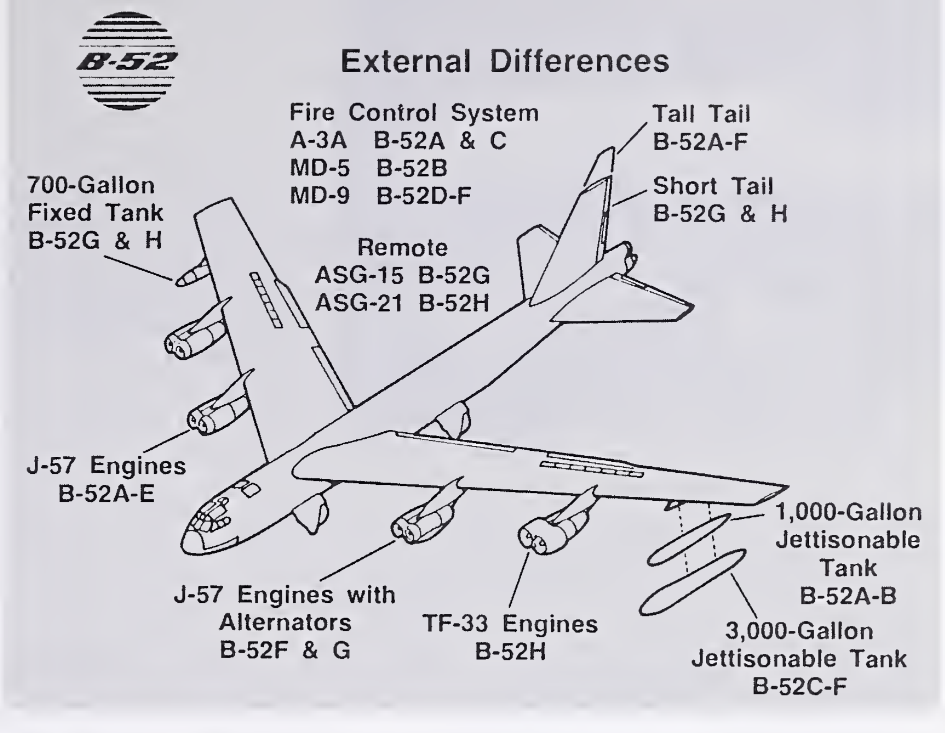
Initial Boeing studies were conducted around turboprop designs with high aspect ratio wings. Wright Aeronautical Corporation T-35 engines were used in these studies. The engines were tested on a specially modified B-17G with the engine mounted in the nose.

Boeing's first design, powered by six T-35 engines rated at 5500 equivalent shaft horsepower (eshp), was the Model 462 which debuted in February 1946. The wing span was 221 feet. A crew of ten was needed to operate this airplane. This design fell short of the desired range objectives primarily because of the lack of a satisfactory engine/propeller combination. Other factors contributing to the demise of this design were the size of the bomb bay and the weight associated with the armament system.

By late 1947, the Model 464-29 was established for a new airframe designed around six turboprop engines. The wing area was increased, while the aspect ratio was reduced. The Air Force now required a special purpose airplane instead of a general purpose weapon system. Consequently, reductions were made to the size of the bomb bay, number of crew members, and armament. A substantial weight savings was realized, making this the first design to achieve the desired range objectives.

Boeing designers were not satisfied with the speed of the Model 464-29 even though it surpassed any bomber then being built. Jet engine developments were not satisfactory at this point in time and Boeing opted for a new four-engined turboprop design which was given the designation of Model 464-35 in January 1948. A Phase II contract was awarded for a mockup and two airplanes.

During the development of the Model 464-35 in mid 1948, problems with the engines and propellers came to light.

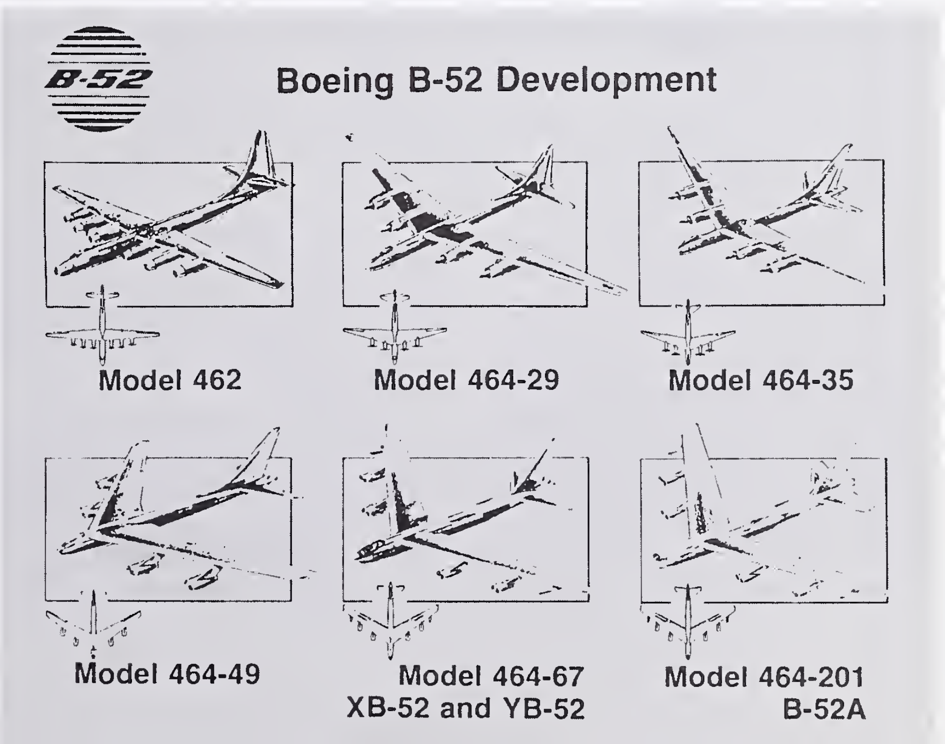

External Differences

Boeing and Wright were joined by the propeller manufacturer and the Air Materiel Command in order to resolve the problems. A major development program was on the horizon, and the Phase II program was in jeopardy. A study, carrying the designation of Model 464-40, was made around eight Westinghouse XJ-40-WE-12 turbojet engines powering the Model 464-35 airframe. The combat radius was reduced from 3070 nm anticipated on the Model 464-35 to 2660 nm for the jet-powered airplane.

Development of the Model 464-35 under the Phase II contact continued. During the week of 22 October 1948, a Boeing team met with Col Henry E. "Pete" Warden, Air Material Command's Chief of Bomber Development in Dayton, Ohio. Col Warden advised the Boeing team that Pratt & Whitney was developing a new turbojet engine (which subsequently carried the designation of J57) which held much promise for the gestating Boeing bomber. On Thursday of that week the magnitude of the engine/propeller problems on the Model 464-35 came into sharper focus. The Boeing team retired to their quarters at the Van Cleve Hotel to discuss the seriousness of the situation. The telephone lines between Dayton and Seattle buzzed with activity as the remote team set out the concepts and the Boeing home team performed the heavy "number crunching" for a new airplane. Over that fateful weekend the team produced a 33-page design proposal for an eight-engined swept-winged intercontinental bomber. This meager document contained a three view drawing, an inboard profile drawing, drag polars and a weights estimate. In an effort not to compromise any existing company documents, this proposal document was given the designation of D-10,000. In addition, George Schairer built a scale balsa wood model. This new airplane carried the Boeing designation of Model 464-49. It had a 35 degree sweep to the wing that spanned 185 feet, and housed the pilots in tandem under a canopy much like the B-47. Over that one weekend this team designed an intercontinental bomber with the speed of a fighter.

In March 1949, minor revisions to the Model 464-49 design resulted in the Model 464-67. The Phase II contract was revised to replace the Model 464-35 with the 464-67. By February 1950, the gross weight had increased from 330,000 to 390,000 pounds in order to provide additional range. On the night of 29 November 1951, the XB-52 was rolled out of the hangar, followed by the YB-52 on 15 March 1952. Damage incurred while testing the XB-52 resulted in the YB-52 making the maiden flight on 15 April. Between June 1946 and April 1952, more than 3,000,000 engineering hours had been expended on the design of the B-52; whereas a mere 153,000 hours had gone into the design of the B-17. The destructive power of one B-52 would equal that of nine B-17s.

Over three years of flight testing were required by a fleet of two prototypes, three B-52As, and 10 B-52Bs before the first airplane was delivered to SAC on 29 June 1955. A total of nine and a half years had elapsed from when the basic requirement was established by the Air Force and the first operational airplane was delivered. Over the ensuing seven and one third years the remainder of the 742 airplane fleet would be delivered.


Boeing B-52 Development

Covered with tarpaulin for security reasons, an XB-52 sits in Boeing factory plant number 2.

A busy airfield in Southeast Asia during Linebacker II. In the span of the 11-day war, B-52s launched 700 sorties against 24 target complexes, loosing 20,370 tons of bombs.

A B-52D with the "Big Belly" mod unleashes its load of 108 gravity bombs.

Production Series

A total of eight different B-52 series airplanes were produced. They were manufactured solely by the Boeing Airplane Company at both the Seattle and Wichita plants. Each airplane series reflected changes resulting from development and technical advances in avionics, engines and structure. While the B-52As were used for testing, the B-52B was the first series to be delivered to SAC. With the exception of the test airplanes, all production B-52s were operated by SAC. No foreign nation has operated these airplanes which are considered to be national assets.

New Mission Requirements

The B-52 Stratofortress was originally designed for use as a high altitude bomber. Subsequently it was learned that the airplane would have to fly at low levels in order to penetrate enemy defenses. In addition, the airplanes would remain in the inventory much longer than the originally anticipated 5000-flight-hour design goal. For both of these reasons structural modifications were required in order to ensure the service life of the airplane. By 1960, it became apparent that certain low level mission enhancements would be required. In a $313.2 million retrofit program five major modifications were required. These changes included: terrain avoidance radar, an improved radar altimeter, increased cooling capacity, equipment mounting provisions and secondary structural improvements. On the B-52C through B-52F airplanes the following structural modifications were made: strengthened body station 1655 bulkhead (just forward of the horizontal stabilizer cutout), wing/body bottle pin rework, empennage rework, and certain wing and body modifications. In addition, the B-52Ds had other wing and body modifications.

Differences between the B-52Gs and B-52Hs from their predecessors were considerable. The design gross weight had been increased from 450,000 pounds to 488,000 pounds. Structural materials were changed in order to provide a higher strength-to-weight ratio. Bladder cells in the wing were replaced by integral fuel tanks using the wet wing concept. Consequently, normal static testing was accomplished on a production airframe. Cyclic testing, fleet damage monitoring and a ten-airplane lead-the-fleet program was initiated. This program called for a 1000-hour lead for the B-52Gs and 1500-hour lead for B-52Hs in the test fleet. Results of the cyclic tests and an accident involving a B-52G indicated that the material used in the wings for its strength-to-weight ratio would not have a satisfactory service life in view of the planned low altitude usage of the airplanes and the anticipated structural service life. Consequently the wing material was replaced with a new material which was more crack resistant. The improved wing was subjected to cyclic tests equivalent to six times the design life without showing any life limiting cracking. An incident involving a Boeing instrumented B-52H occurred in severe clear air turbulence with horizontal gusts. Only about 15 percent of the vertical fin remained, but the crew was able to land the airplane safely. Data from the airplane instruments resulted in additional structural modifications. These changes were subjected to 7.6 design life time cycles without encountering any life limiting cracking.

A second major modification program to improve low level operations was accomplished between 1971 and 1977 at a cost of $248.5 million. This change incorporated the electro-optical viewing system (EVS) on the B-52G and B-52H airplanes. The system includes a low light level TV and forward looking infrared (FLIR) sensors mounted on the nose. The TV and FLIR are integrated with the AN/ASQ-38 terrain avoidance radar. Controls and displays were added to the pilots and navigators stations.

Numerous electronic warfare (ECM) improvements have been made over the years in order to enhance penetrations. Phase II ECM modifications were accomplished on the B-52C through B-52G between 1961 and 1969 at a cost of $127.6 million. The loss of 17 B-52s to SA-2 missiles in Southeast Asia resulted in a new round of ECM updates in late 1972. It was believed that the North Vietnamese were using Fan Song B S-band radar incorporating some features of the Fan Song E radar. Other ECM modifications were made, but the most extensive was conducted in Phase VI beginning in 1973. This $362.5 million program was accomplished on the B-52Gs and B-52Hs in order to meet the challenges posed by increasing threats.

Giant Rototiller in the Sky

Since its inception, strategic airpower has always played a significant role in reducing the enemy's will to fight. During WWII, strategic airpower came into its own. Lessons learned were carried forth into the Korean Conflict. Captured enemy troops in Korea stated that the most feared weapon was the B-29 because of its effect on troop concentrations. In Vietnam this story was repeated. While the B-52 was designed to be a nuclear bomber, it was given a conventional role in Southeast Asia. Formations of B-52s flew at high altitudes out of sight and earshot. They rained iron bombs on the enemy, wreaking havoc with his fortifications built 10-15 feet underground. Like a giant rototiller in the sky, the B-52s carpeted the target area with precision pattern bombing, thus shattering a number of enemy buildups and disrupting plans for major ground assaults against allied forces. A Rand Corporation report stated: "Fear of B-52 attack seems to be widespread and not confined only to the areas that have experienced them. The B-52s were described as being the most devastating and frightening weapon used so far against the Viet Cong and were said to have great effect on Viet Cong morale." The effect of the B-52 raids during Operation Linebacker II is readily apparent when one considers the fact the communists enthusiasm for peace negotiations was directly proportional to the bombing of the north. When peace negotiations were terminated by the North Vietnamese in mid December 1972, Linebacker II was initiated. It was known as the 11-day war. With the exception of Christmas Day, the B-52s flew daily. They launched 700 sorties against 24 target complexes, loosing 20,370 tons of bombs. Negotiations resumed on 8 January 1973. B-52 raids over North Vietnam continued until 15 January. On 27 January a peace accord was reached with the North Vietnamese. The last B-52 mission was flown in Southeast Asia on 15 August 1973, ending eight years of operations.

B-52 Inventory

The B-52Bs and B-52Cs were replaced by the improved B-52Ds. By 1972 11 B-52Cs had been retired. In 1970 and 1978, respectively, the B-52Es and B-52Fs were dropped from the inventory because of systems differences which resulted in maintenance problems caused by a lack of commonality and the fact that they were in fewer numbers than the B-52D. Another factor was that the B-52D had the high density bombing capability. The B-52Ds began phasing out of the inventory in 1978; by 1983 the last of this series was retired. The following airplanes are in extended storage at Davis-Monthan AFB: 30 B-52Cs, 47 B-52Ds, 48 B-52Es, and 59 B-52Fs.

Since 1983, only the B-52Gs and B-52Hs have served in SAC. Their number is in excess of 260. A new offensive avionics system has been installed in order to improve their effectiveness. Most of these airplanes have been modified to carry up to 12 AGM-86B ALCMs on the external pylons. A subsequent modification will be incorporated on all B-52Hs allowing them to carry a rotary launcher which is capable of carrying either eight ALCM or eight SRAM, or clips of gravity bombs. A total of 69 B-52Gs are being modified to carry up to 51 conventional bombs, 12 AGM-84 Harpoon anti-ship missiles on the external pylons, or a wide array of sea mines. Two wings are currently operational with the Harpoon; the 42 BMW at Loring AFB, Maine, and the 43 BMW at Andersen AFB, Guam. A pair of B-52s performing the maritime surveillance role can cover 140,000 square miles of ocean within two hours. All of our B-52Hs can carry up to 27 conventional bombs or sea mines.

Thirty-five years after the maiden flight of the YB-52, the Stratofortress continues to ensure the SAC motto: "Peace is our Profession." If current plans remain intact, we can be assured that the B-52 will continue maintaining an ever vigilant eye to assure world peace.

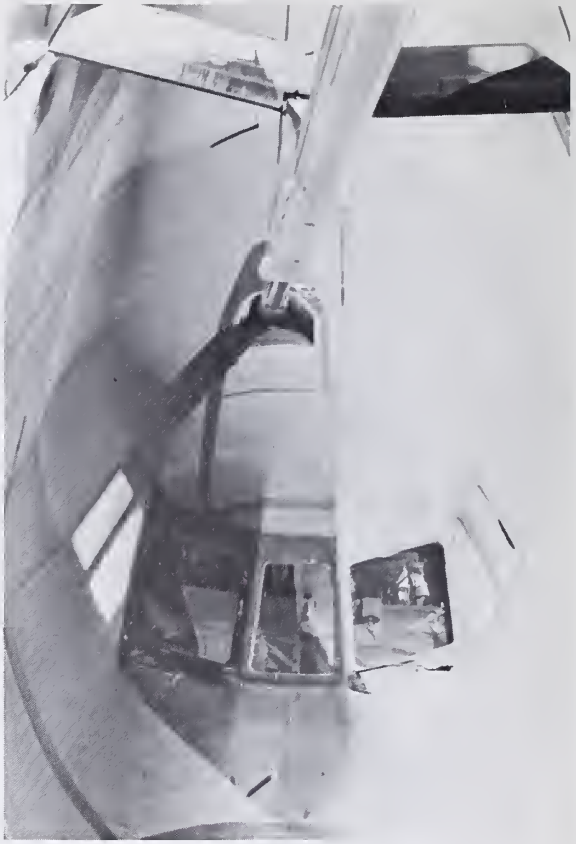
USAF photos by

SSgt Bryan Koeller
2 CSG/OTCP, Barksdale AFB

Maj Bob Neidrick

Left The KC-10 boom pod is measurably more comfortable than its KC-135 counterpart.

Right Between England AFB and Robert Gray AAF, the KC-10 demonstrated the second half of its multimission role as it completed air refueling with the C-5.



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The jeeps and Blazers were uploaded in under two hours and there was still additional cargo capacity available. The KC-10 is capable of carrying 170,000 pounds of cargo and up to 27 pallet positions. Although the Army personnel were carried in the C-5 on this mission, the KC-10 can carry up to 75 passengers in addition to the above cargo. Our gross weight out of England was 419,500 pounds with a takeoff distance at 6700 feet and critical field length of 7600 feet. The KC-10 maximum takeoff weight is 590,000 pounds.

The Army unit had been operating at England AFB with the 23 Tactical Fighter Squadron (A-10s) for eight days as part of the exercise. The squadron consists of 18 Cobra gunships, three UH-1 command aircraft and 13 OH58 Scout helicopters. While the land vehicles were loaded on the KC-10, the C-5 crew uploaded five Cobras and three OH58s, plus a 7000 pound baggage pallet and 72 passengers.

Soon after both aircraft were loaded they took off enroute to Robert Gray AAF at Ft. Hood. During this leg the KC-10 demonstrated the second half of its multimission role as it completed air refueling with the C-5. The Galaxy was flown by Maj Charles Kleiber, pilot, and Capt Cary Gunderson, copilot, of the 75 Military Airlift Squadron, Travis AFB. The C-5 crew invited me to join them during the flight to Ft. Hood so I could view the KC-10 from the business end. Both were impressed with the KC-10 and its capabilities.

After landing at Ft. Hood, the KC-10 was unloaded, again in minimal time, and we were headed back to Barksdale. Although this particular mission did not utilize the full capability of the crew/aircraft, as is done on many missions, it provided important hands on training for SAC, MAC and Army personnel and dramatically demonstrated the KC-10's multimission capability. Some may still refer to the KC-10 as the "Gucci" jet because of its original paint scheme and modern features, but those who have seen it at work know why it is officially named the "Extender."

About the author. With this issue, Maj Neidrick completes his stint at Combat Crew. He started his tenure as the 13th editor of the publication in July 1984. Later this month, he will assume his new duties as director of operations, 3AD OL HI at Hickam AFB, HI.

SAC SAFETY SCREEN

The SAC Safety Screen is an honor roll of SAC's most professional crews. To gain listing on the Screen, crew members must be nominated by their unit commanders and meet high selection criteria of experience in their aircraft or missile system *IAW AFR 127-2/SS1.*

337 BMS, Dyess Crew R-12: P Maj Hiram Payne, CPY Capt Matt Bright, CPX Capt Tom Tomaras, OSO Capt Jim Meier, DSO Capt Ric Mayer

337 BMS, Dyess Crew R-13: P Capt Mark Simmons, CP Capt Bill Beatovich, OSO Capt Steve Borecky, DSO Capt Nelson English

338 CCTS, Dyess Crew Z-73: IP Maj David L Eggers, IOSO Maj Peter W Kippie, IDSO Maj Joseph E Burns

338 CCTS, Dyess Crew Z-64: IP Lt Col David R Hall, IOSO Maj Dennis N Hutchings, IDSO Capt John E Remisovsky

917 AREFS, Dyess Crew E-114: IP Capt Michele A Woolman, CP 1Lt Michael J Burcham, IN 1Lt Randy L Gibson, IB Sgt Billie J Black Jr

917 AREFS, Dyess Crew R-131: MP Capt Joseph R Ficerai, CP 1Lt James G Fish, MN 1Lt William C Patrick, MB Amn Lynn A Thatcher

128 AREFG, Gen Mitchell Fld, Milwaukee, WI: IP Lt Col James F Graczyk, P Capt Donald V Paddock, N Maj James D Franken, IBO SMSgt Floyd L Polzin

28 AREFS, Ellsworth Crew E-113: P Capt Patrick C Lewis, CP 1Lt Richard E Glenn II, N 1Lt Charles H Winham Jr, BO SSgt Kerry G Gulzow

4 ACCS, Ellsworth Crew R-114: IP Lt Col Wayne Anderson, CP 2Lt Greg Samson, CP Capt Vern Blomquist, N Capt Marc LeCours, BO SSgt Wayne Hillegeist, MCCC Maj Alexander Carlisle, DMCCC Capt Chuck Vickrey, OC Maj Wayne Sterzinger, EAC Sgt Jeff St Onge, FSC TSgt Harry Pool, OP Maj Gary Lynn, OP Capt Collins Shackelford, Log Capt Tom Martin, Log SMSgt Larry Wenzlick, Intel Capt Frank Sipes, Intel Capt Dave Gau, Comm Capt Alan Buhler, RO SSGt Dan Determan, RO SSgt Kevin Spiller, RO Amn Ken Rosenberger, Data Sgt Tim McLaughlin, Data TSgt Bill Owens, Data TSgt Larry Duhaime, Radio Mtn SSgt Roger Lee, Radio Mtn Don Foster

328 BMS, Castle Crew IT-42: IP Capt John M Edens, IRN Capt Marlon W Johnston, IEWO Capt Samuel R Hicks, 1G TSgt Dennis L Ray

328 BMS, Castle Crew IT-44: IP Capt Robert D Perry, IRN Capt Gerald E Valentini, IEWO Capt Charles L Alday, IG SSgt Timothy A Reuning

924 AREFS, Castle Crew R-111: P Capt David B Giddings, CP 2Lt Jeffrey S Nason, N Maj Richard P Will, BO Amn Gregory A Warren

93 AREFS, Castle Crew: IP Capt Mark J Meyers, IN Lt Col James W Steinmann, IBO SSgt Cleveland Williams

93 AREFS, Castle Crew: IP Capt John P Smallwood, IN Capt Gary S Neilsen, IBO TSgt Thomas S Dewitt

321 SMW, Grand Forks Crew R-121: MCCC 1Lt Walter E Anderson, DMCCC 2Lt Joseph V Bealkowski

341 SMW, Malmstrom Crew R-114: MCCC 1Lt Steven W Pearson, DMCCC 2Lt Douglas D Harris

91 SMW, Minot Crew E-123: MCCC Capt Douglas J Harvey, DMCCC 1Lt William F Sims

351 SMW, Whiteman Crew E-082: MCCC 1Lt Dino Eliadis, DMCCC 1Lt Keith J Hansen

70 AREFS, Grissom Crew R-152: P Capt James Kilty, CP 1Lt Christopher Miller, N 1Lt Boyd Long, BO TSgt Nathan Wilds

305 AREFS, Grissom Crew R-111R: P Capt Gregg Dotter, CP Capt Timothy Talbot, N 1Lt Benjamin Hulsey, BO SrA David O'Brien

42 AREFS, Loring Crew E-125: P Maj Ronald Rutland, CP Capt William Wilson Jr, NN Capt Thomas Bauckman, BO SSgt Daniel Cersosimo

69 BMS, Loring Crew S-02: EP Maj John Rogacki, CP 1Lt Michael Habrukovich, ERN Capt Wilton Burwell, EN1 Capt Walter Williams, EN2 1t Anthony Parlati, EEW Capt Matthew Leavitt, EG SSgt Claude Bisson

69 BMS, Loring Crew R-11: P Capt Thomas Claypool, CP 1Lt Lawrence Echanis, RN Capt Gary Mitchell, NN 1Lt Darrell Houmes, EW 1Lt Jeffrey Hubbard, AG Sgt Mark Santifort

407 AREFS, Loring Crew R-171: P Capt Martin Doebel, CP 1Lt Robert Clyburn, NN Capt Marian Brown, BO SrA Richard Gano

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CONGRATULATIONS!

The Chief of Staff, HQ USAF, has selected Strategic Air Command to receive the Secretary of the Air Force Safety Award for 1986. This award, the highest in the Air Force Safety Awards Program, is presented annually to the major command that has the most effective safety program in all safety functional areas. You made it happen. Your hard work, attention to detail and quest for excellence has paid off. Congratulations on a super job and keep up the good work! ★★★★